Andrew T. Walter

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Education

Northeastern University (NEU) — Boston, Massachusetts
Doctor of Philosophy, Computer Science — (*expected)* **Spring 2025**

- Advised by Panagiotis Manolios. 4.00 overall GPA.

Masters of Science, Computer Science — **June 2021**

- 4.00 overall GPA

Worcester Polytechnic Institute (WPI) — Worcester, Massachusetts
Bachelor of Science, Computer Science — **May 2018**

- Minor in Mathematical Sciences, 3.72/4.00 overall GPA

Selected Publications

Walter, A. T., Kumar, A., & Manolios, P. "Proving Calculational Proofs Correct," in *ACL2 2023*, ser. EPTCS 393, 2023, 133-150. DOI 10.4204/EPTCS.393.11 — **Nov. 2023**

Walter, A. T., Greve, D, & Manolios, P. "Enumerative Data Types with Constraints," in *FMCAD 2022*, 189-198. DOI 10.34727/2022/isbn.978-3-85448-053-2_25 — **Oct. 2022**

Walter, A. T. & Manolios, P. "ACL2s Systems Programming," in *ACL2 2022*, ser. EPTCS 359, 2022, 134-150. DOI 10.4204/EPTCS.359.12 — **May 2022**

Walter, A., Cooper, S., & Manolios, P. "A Reasoning Engine for the Gamification of Loop-Invariant Discovery". *Preprint arXiv:2109.01121*. — **(preprint) Sept. 2021**

Walter, A. T., Boskin, B., Cooper, S., & Manolios, P. "Gamification of Loop-Invariant Discovery from Code," in *HCOMP 2019*, 188-196. DOI 10.1609/hcomp.v7i1.5277 — **Oct. 2019**

Professional Experience

Member of Technical Staff – Intern, Rivos Inc. — **May 2023 – Sept. 2023**
Performed formal verification work on processor RTL.

Applied Science Intern, Amazon — **May 2022 – Sept. 2022**
Explored the feasibility of using code analysis tools to track data across cloud applications.

PhD Student, NEU — **Sept. 2018 – Present**
Researching how to make theorem provers more accessible and more usable in a variety of applications. See ***Projects*** for PhD work.

StarLogo Nova Research, WPI Bioinformatics Department — **May 2017 – August 2018**
Developed a debugging tool for use within the StarLogo Nova online agent-based modeling program.

Big Data Intern, Rakuten USA — **May 2016 – August 2016**
Implemented a tool for visualizing data about searches on Rakuten's U.S. online marketplace.

Software Quality Assurance Intern, Brooks Automation — **May 2015 – August 2015**
Designed and executed a test plan for controller software for automated robotic systems. Interfaced software with an external sensor.

Projects

Microarchitectural Correctness via Refinement, NEU — **April 2023 – Present**
Exploring the use of refinement in defining a global notion of correctness for microarchitectural designs that encompasses transient execution in addition to functional correctness.

Formal Model of the RISC-V ISA, NEU — **Nov. 2020 – Present**
Developing a formal model of a subset of the RISC-V ISA in ACL2s.

Witness Generating Data Types, NEU — **June 2020 – Present**
Developing a data-type framework that enables efficient witness generation, for use in fuzzing and counterexample generation.

CS2800 Proof Checker, NEU — **Jan. 2020 – Present**
Developed and evaluated a tool designed to check semi-formal proofs produced by students in the CS2800 Logic and Computation course.

Lisp-Z3 Interface, NEU — **June 2020 – Present**
Developed a low-overhead Lisp interface for the Z3 SMT solver, and used it to implement an efficient fuzzer for a subset of the WiFi protocol.

Model-Based Protocol Fuzzing, NEU — **Dec. 2018 – Sept. 2020**
Investigated several different methods for developing automated fuzzers for complex protocols using ACL2s.

Techniques of Programming Language Translation, WPI — **Jan. 2017 – May 2017**
Wrote a compiler for Dijkstra, a simple language that targets the JVM. Outside of class, rewrote the compiler in Rust to target LLVM.

Teaching

Teaching Assistant, NEU — **Sept. 2022 – Dec. 2022,**
CS2800 – Logic and Computation — **Jan. 2022 – May 2022,**
Jan. 2021 – May 2021,
Jan. 2020 – May 2020

Student Assistant, WPI
CS2011 – Introduction to Machine Organization and Assembly Language, — **Mar. 2018 – May 2018**
CS2303 – Systems Programming Concepts, — **Jan. 2018 – Mar. 2018**
CS210X – (experimental) Accelerated Object Oriented Design Concepts — **Oct. 2017 – Dec. 2017**
CS2301 – Systems Programming for Non-Majors, — **Mar. 2017 – May 2017**
CS1004 – Introduction to Programming for Non-Majors — **Jan. 2016 – Mar. 2017,**
Oct. 2016 – Dec. 2016

Selected Coursework

NEU: Special Topics in Formal Methods, Theory of Computation, Computer Architecture
WPI: Techniques of Programming Language Translation, Programming Languages, Data Analytics and Statistical Learning, Software Engineering, Analysis of Algorithms, Operating Systems

Skills

Programming Languages: ACL2, Python, R, Java, C/C++, C#, JS + Angular, TypeScript, Common Lisp, Bash, LaTeX, Scala, Rust, x86 & RISC-V assembly, Coq, SystemVerilog, Tcl

Applications/Services: git, Jasper, Z3, Amazon EC2, Apache 2, nginx, LLVM, Xtext, Docker, Eclipse, SLURM, FuseSoC